

1966 OPERATING SUMMARY

NEWMARKET - E. GWILLIMBURY

**water pollution
control plant**

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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Newmarket-East Gwillimbury Local
Advisory Committee,
Town of Newmarket and Township of East Gwillimbury.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the
Newmarket-East Gwillimbury Water Pollution Control Plant, OWRC Pro-
ject No. 61-S-87.

It is hoped that our joint participation in efforts to combat water pollution
will have even more success in the coming year.

Yours very truly,


D. S. Caverly,
General Manager.



ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

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TELEPHONE 365-

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Newmarket-East Gwillimbury Water Pollution Control Plant, OWRC Project No. 61-S-87.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

A handwritten signature in cursive ink, appearing to read "B. C. Palmer".

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

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**NEWMARKET-EAST GWILLIMBURY
water pollution control plant**

operated for

THE TOWN OF NEWMARKET

and

THE TOWNSHIP OF EAST GWILLIMBURY

by the

ONTARIO WATER RESOURCES COMMISSION

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DIVISION OF PLANT OPERATIONS

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Assistant Director: C. W. Perry
Regional Supervisor: D. A. McTavish
Operations Engineer: R. Kauppinen

801 Bay Street Toronto 5

'66 REVIEW

The operating cost for 1966 was \$38,546.14, an increase of 16.5% over the 1965 costs. However, the cost per million gallons treated increased only 3% from \$68.38 to \$70.41, while the cost per pound of BOD removed remained the same at four cents. Payroll, sundry and power items amounted to 81.2% of the total cost.

A total of 547.45 million gallons of raw sewage was treated during 1966, an increase of 13% over the 1965 total flow. The average daily flow was 1.50 million gallons per day which is 75% of the design dry weather flow. BOD and suspended solids removals averaged 90.0% and 95.5% respectively over the year.

The total volume of sludge pumped to the digesters during 1966 was 314,300 cubic feet, and 137,240 cubic feet were hauled at a cost of \$4,965.30.

During the chlorination period of the year, 10,980 pounds of chlorine were used to disinfect the final effluent at an average dosage rate of 4.61 parts per million.

In general, the plant operated well during 1966 although the quality of the effluent was slightly in excess of the OWRC objectives of 15 ppm BOD and suspended solids. In October 1966, the deficiencies with the mechanical aerator motors were rectified with the replacement of six of the twelve 7.5 HP electric motors under warranty. Since then they have performed satisfactorily.

PROJECT COSTS

NEWMARKET - STAGES 1 and 3

NET CAPITAL COST (Final)		<u>\$124,240.90</u>
DEDUCT - Portion Financed by CMHC (Estimated)	\$63,826.81	
- Payments from Municipalities	<u>23,980.94</u>	<u>87,807.75</u>
Long Term Debt to OWRC		<u>\$ 36,433.15</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966		<u>\$ 3,044.61</u>
Net Operating		\$ Nil
Debt Retirement		735.00
Reserve		618.44
Interest Charged		2,049.77
TOTAL		<u>\$ 3,403.21</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 2,022.60
Deposited by Municipality	618.44
Interest Earned	126.01
	<u>\$ 2,767.05</u>
Less Expenditures	-
Balance at December 31, 1966	<u>\$ 2,767.05</u>

NEWMARKET - STAGE 2

NET CAPITAL COST (Estimated)		<u>\$700, 694. 82</u>
DEDUCT - Portion Financed by CMHC (Estimated)	\$449, 521. 34	
- Payments from Municipalities	<u>90, 000. 00</u>	<u>539, 521. 34</u>
Long Term Debt to OWRC		<u>\$161, 173. 48</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966		\$ <u>9, 751. 82</u>
Net Operating		\$ 26, 982. 10
Debt Retirement		3, 270. 00
Reserve		5, 614. 63
Interest Charged		<u>9, 037. 72</u>
TOTAL		<u>\$ 44, 904. 45</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 6, 611. 37
Deposited by Municipality	5, 614. 63
Interest Earned	<u>489. 37</u>
	\$ <u>12, 715. 37</u>
Less Expenditures	-
Balance at December 31, 1966	<u>\$ 12, 715. 37</u>

EAST GWILLIMBURY - STAGES 1 and 3

NET CAPITAL COST (Estimated)	\$	Nil
DEDUCT - Portion Financed by CMHC (Estimated)		
- Payments from Municipalities		
Long Term Debt to OWRC	\$	<u>Nil</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	\$	Nil
Net Operating	\$	Nil
Debt Retirement		Nil
Reserve		154.43
Interest Charged		<u>Nil</u>
TOTAL	\$	<u>154.43</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$	501.58
Deposited by Municipality		154.43
Interest Earned	\$	<u>30.77</u>
		<u>686.78</u>
Less Expenditures		<u>-</u>
Balance at December 31, 1966	\$	<u>686.78</u>

EAST GWILLIMBURY - STAGE 2

NET CAPITAL COST (Estimated)	\$284,099.63
DEDUCT - Payments from Municipalities	<u>284,857.04</u>
Long Term Debt to OWRC	(\$ <u>757.41 cr.</u>)
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	\$ <u>Nil</u>
Net Operating	\$ 11,564.04
Debt Retirement	Nil
Reserve	2,406.70
Interest Charged	Nil
 TOTAL	 <u>\$ 13,970.74</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 2,833.30
Deposited by Municipality	2,406.70
Interest Earned	<u>209.52</u>
	\$ 5,449.52
Less Expenditures	 -
 Balance at December 31, 1966	 <u>\$ 5,449.52</u>

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDAY	WATER
JAN	1707.25	1236.95		100.08			54.19	0.83		315.20	
FEB	1980.57	1168.44			587.77		45.51	22.06	79.90	44.89	32.00
MARCH	2272.49	1172.61			596.96		24.69	6.18	401.91	71.14	16.00
APRIL	2905.14	1791.74		122.18	519.64		84.98	61.37	225.97	75.26	24.00
MAY	3840.57	1234.08			562.53	342.56	76.21		27.30	1581.89	16.00
JUNE	5276.95	1297.69	309.36		445.23		64.45	76.52	245.78	2813.92	24.00
JULY	2752.17	1172.20	309.36		470.33	176.80	103.26		87.09	409.13	24.00
AUG	3235.33	1515.75	309.36	122.60	478.81	570.95	147.44		31.50	58.92	
SEPT	4279.60	1841.46	116.88		488.68	319.72	71.41		311.38	1130.07	
OCT	3572.55	1225.18		117.60	481.91	570.94	42.87	398.20	33.03	654.82	48.00
NOV	2640.25	1174.97			534.78		135.71	270.22		516.57	8.00
DEC	4083.27	1161.78	152.69		1349.62		219.37	73.48	3.00	1107.33	16.00
TOTAL	38546.14	15992.85	1197.65	462.45	5499.26	1980.97	1070.09	908.35	1446.86	8779.14	208.00

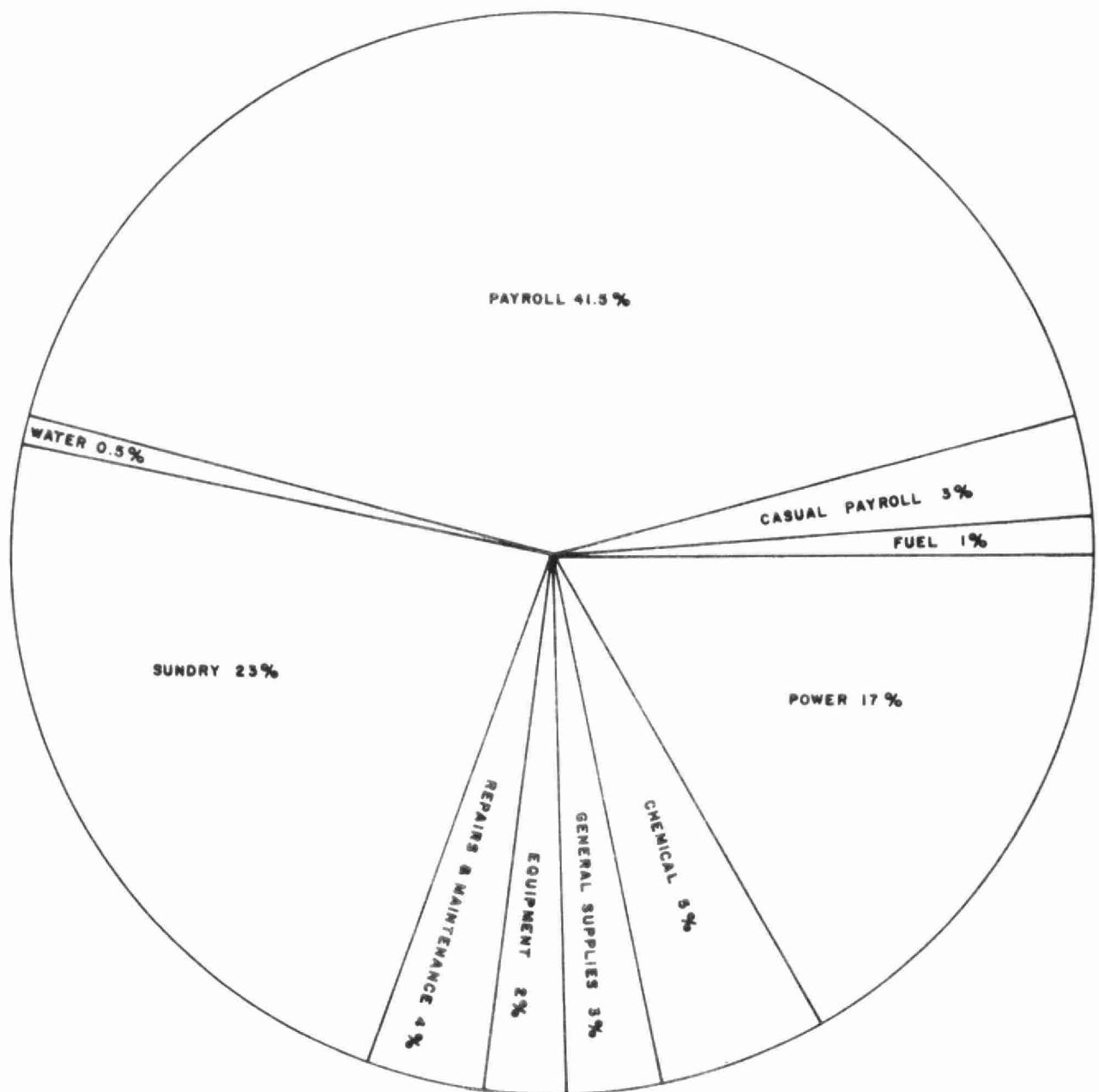
* SUNDAY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$4965.30

YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1965	476.231	\$32566.48	\$14.94	\$68.38	4 CENTS
1966	547.447	\$38546.14	\$16.96	\$70.41	4 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

1966 OPERATING COSTS

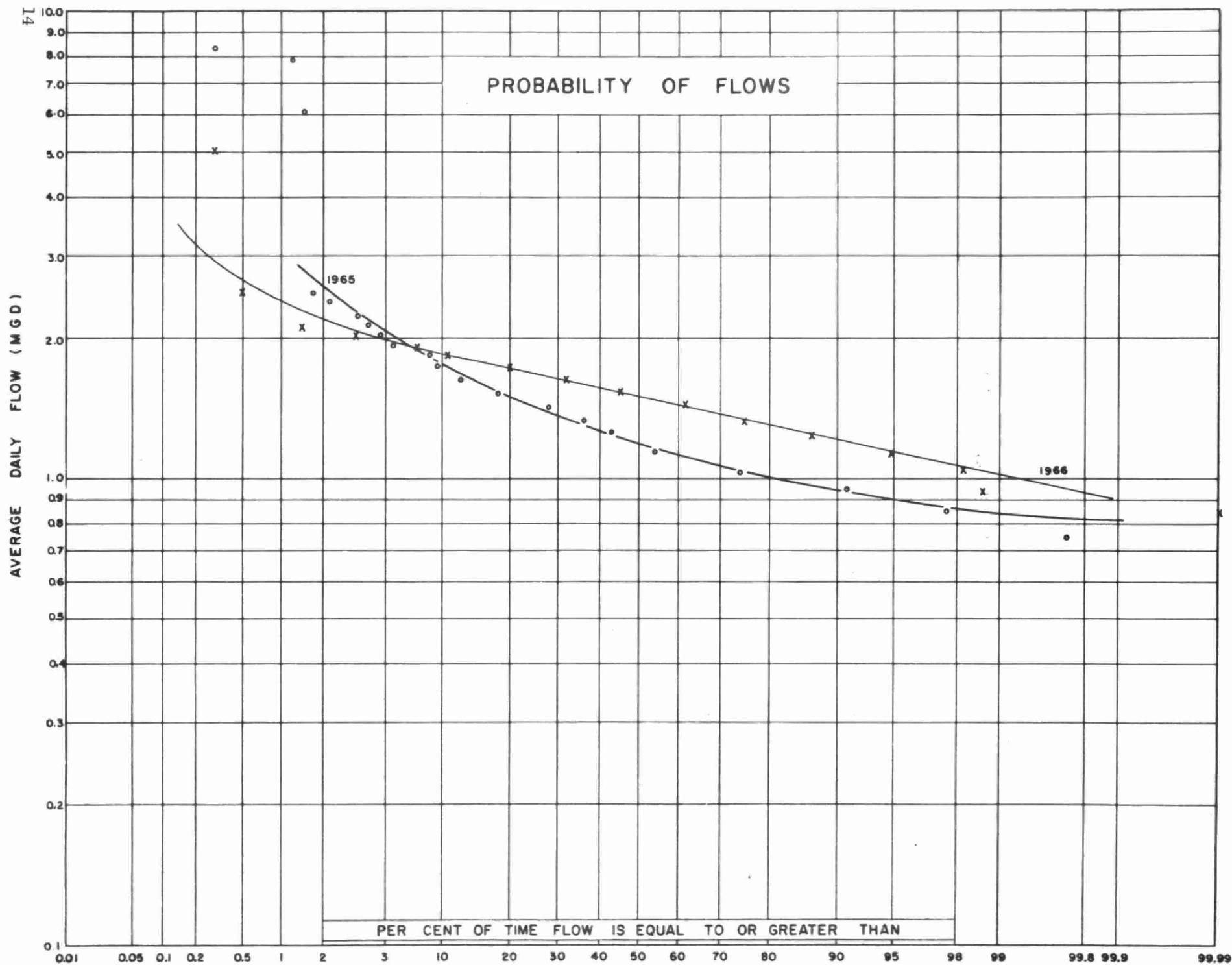


Process Data

FLOWS

On the average daily flow graph, it can be seen that with the exception of the high flows during February, March and April 1965, there appears to be a generally increasing trend in flows since May 1965. This is borne out by the fact that the average daily flow in 1965 was 1.31 mgd which increased to 1.50 mgd in 1966.

From the probability of flow graph, it can be seen that in both 1965 and 1966, the plant design capacity of 2.0 mgd was exceeded approximately three percent of the time. As the average slope of the 1965 curve is steeper than that of the 1966 curve, this would indicate that while heavier flows are being experienced at the plant, lower peak flows have occurred during 1966.



AVERAGE DAILY FLOW

M.G.D.

2.5

2.0

1.5

1.0

0.5

0.0

1965

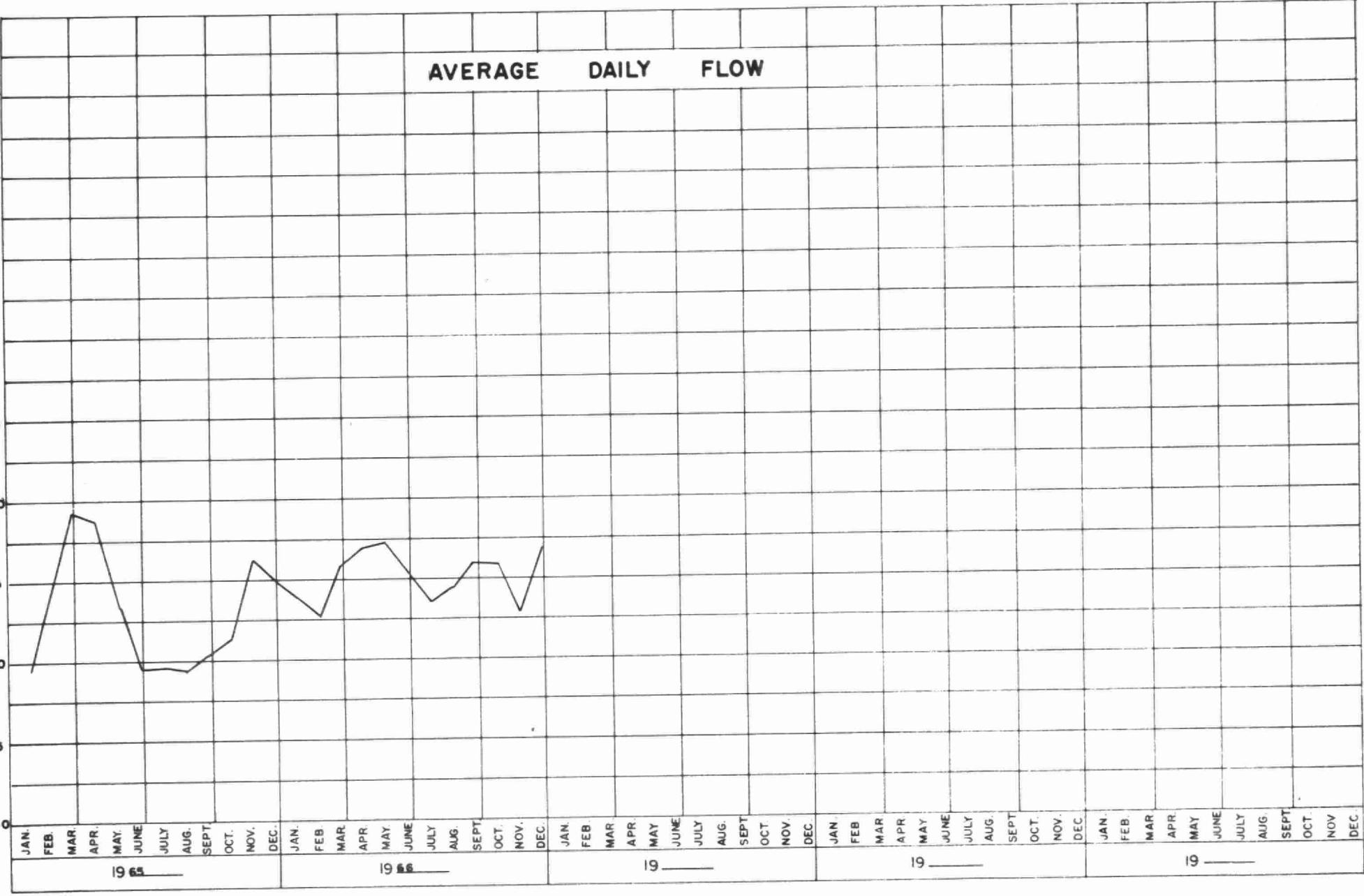
1966

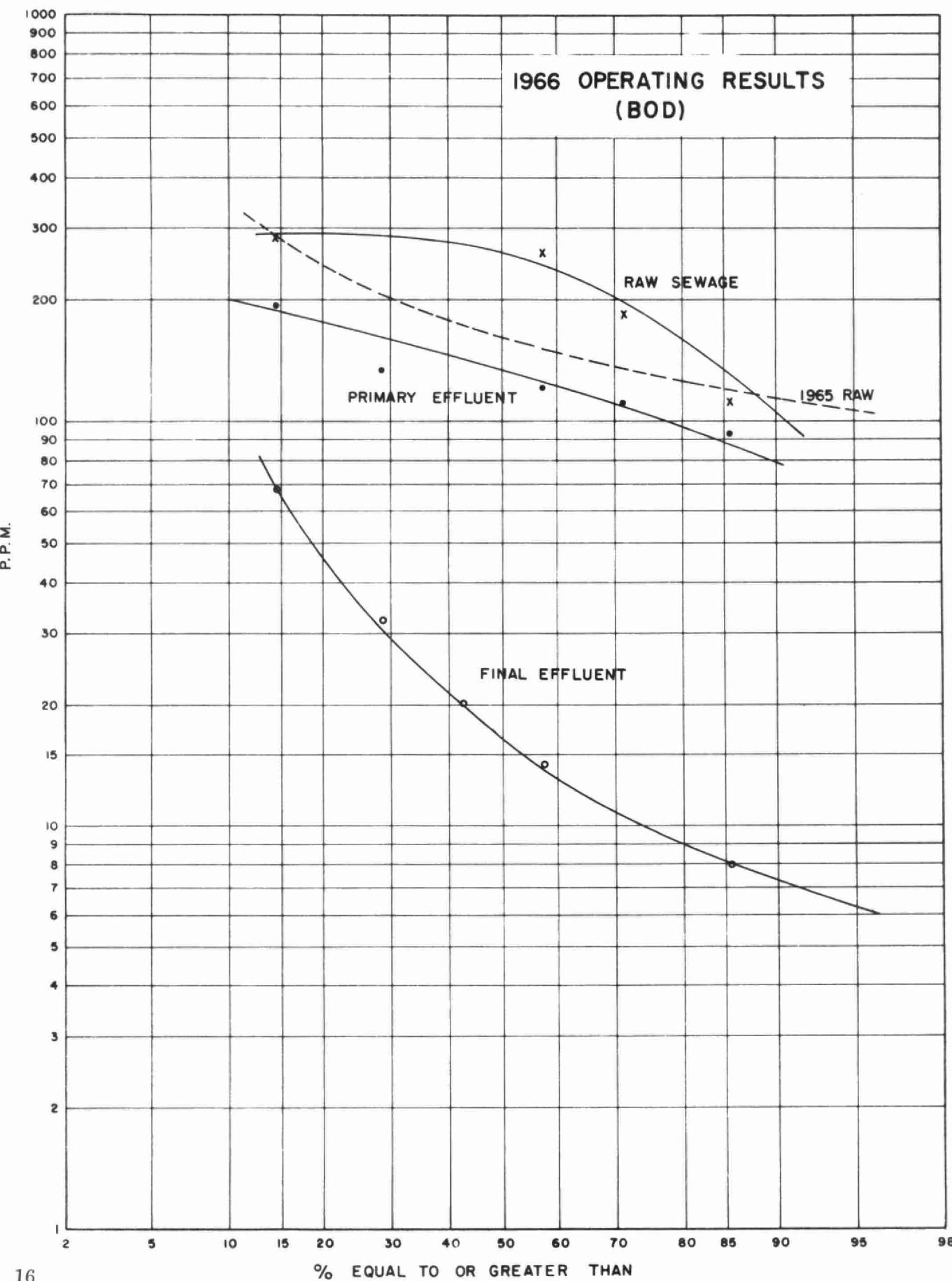
1967

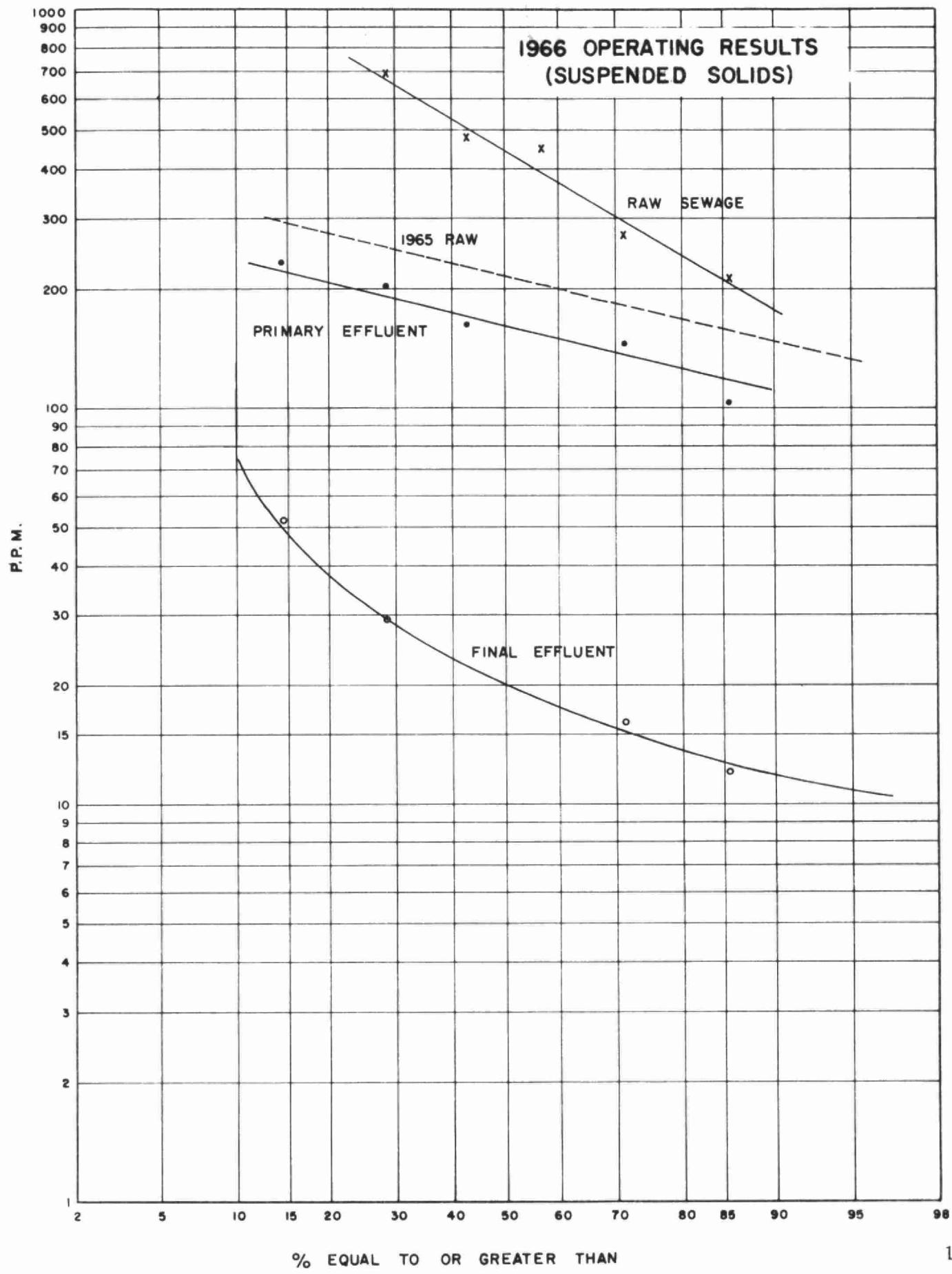
1968

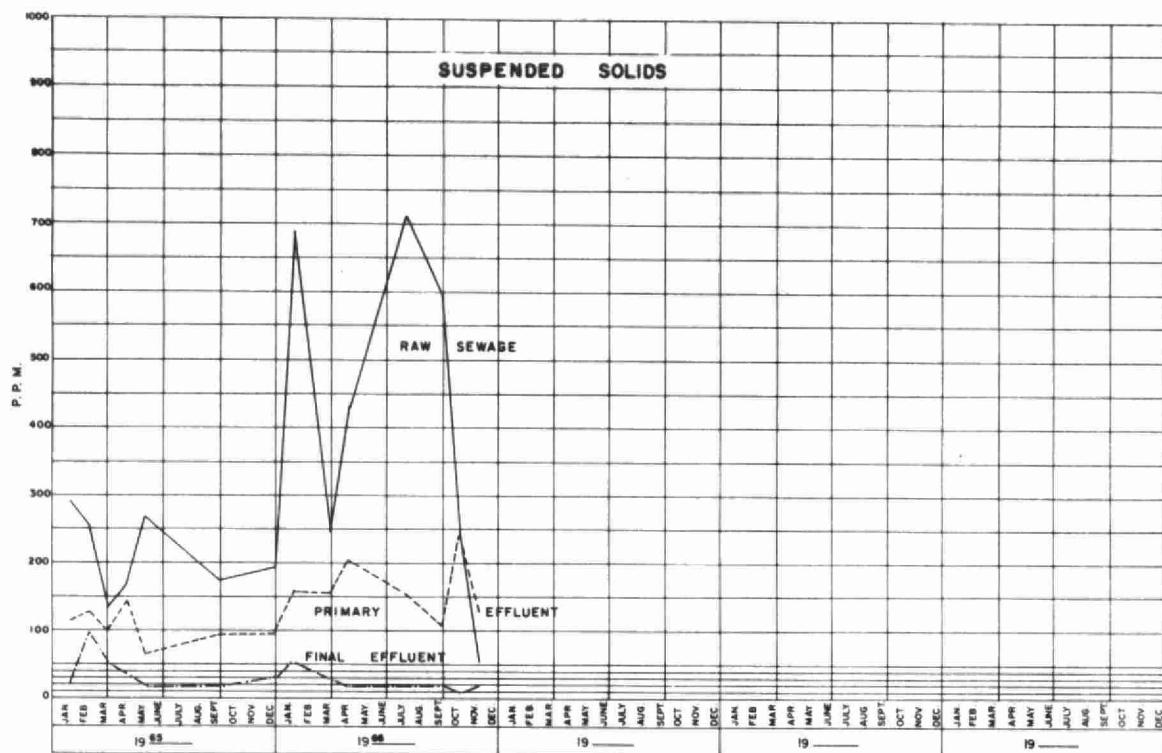
1969

GT

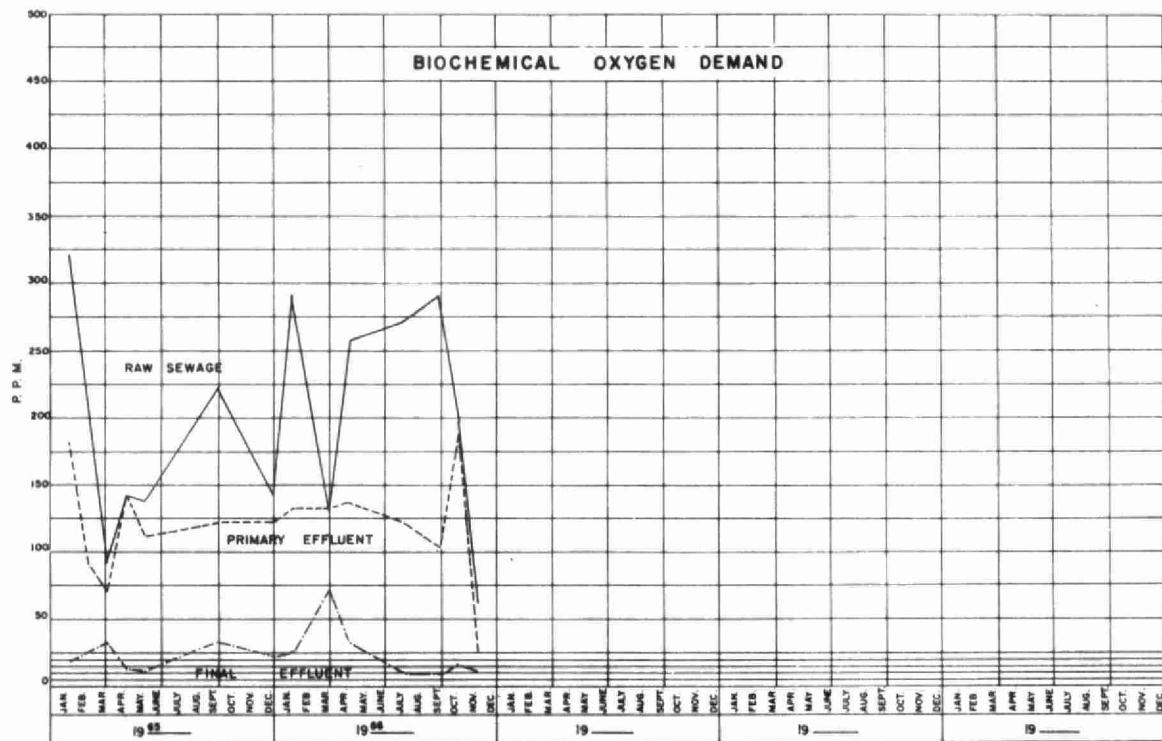








MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.			
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED
JAN.	290	22	92.5	54.4	686	50	92.5	129.0
FEB.	* 211	21	90.0	33.3	* 433	20	95.5	72.4
MAR.	120	68	43.5	12.7	244	26	89.5	53.2
APR.	255	30	88.0	57.1	427	17	96.0	104.1
MAY	* 211	21	90.0	50.8	* 433	20	95.5	110.4
JUNE	* 211	21	90.0	44.0	* 433	20	95.5	95.6
JULY	270	6	98.0	55.3	714	14	98.0	146.6
AUG.	* 211	21	90.0	42.2	* 433	20	95.5	91.8
SEPT.	290	4	98.5	68.5	598	16	97.5	118.3
OCT.	195	12	94.0	44.7	236	7	97.0	55.9
NOV.	58	6	89.5	9.8	126	11	91.5	21.7
DEC.	* 211	21	90.0	49.1	* 433	20	95.5	106.7
TOTAL	-	-	-	520.1	-	-	-	1130.5
AVG.	211	21	90.0	43.3	433	20	95.5	94.2

* Average values substituted

COMMENTS

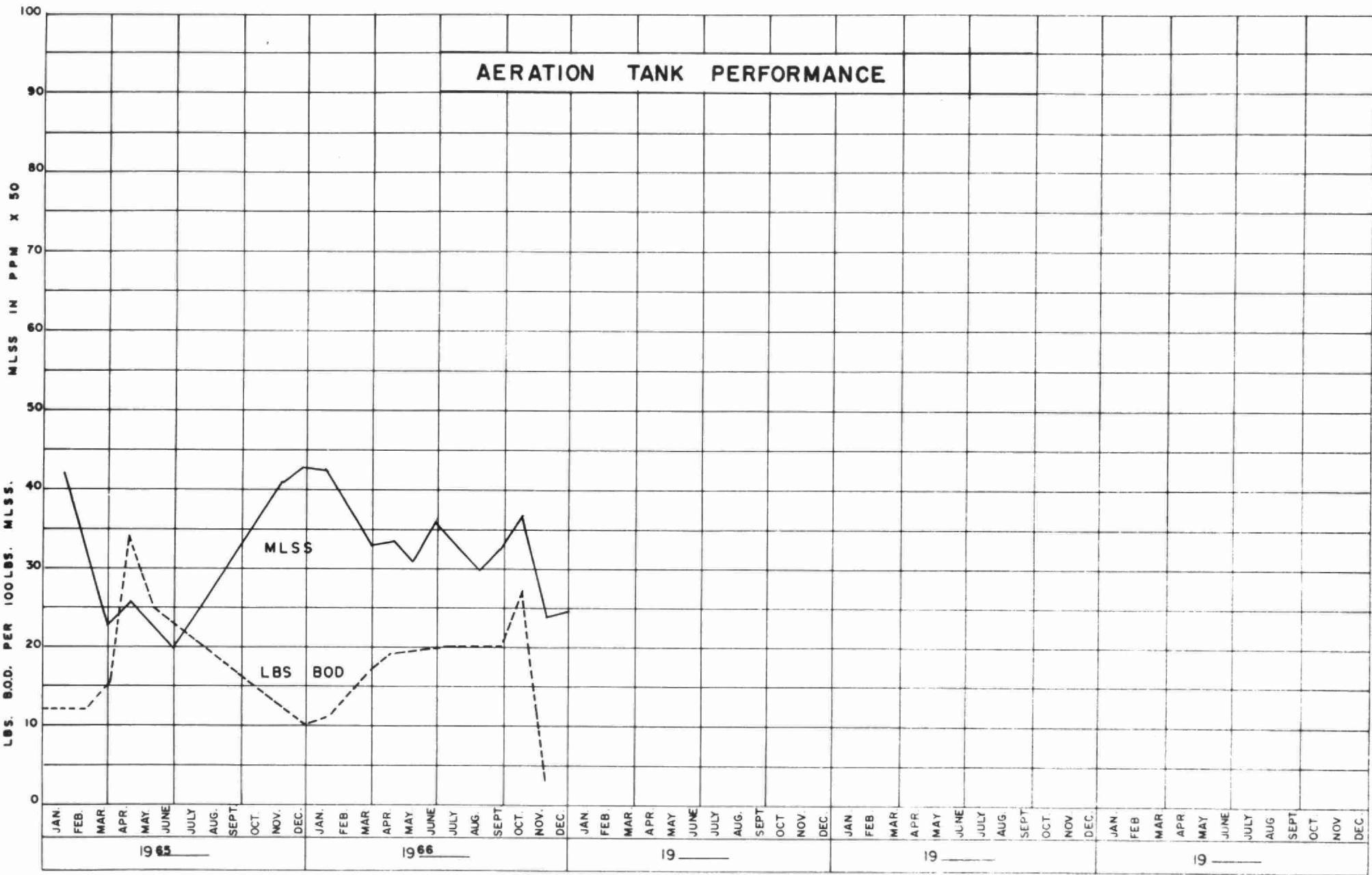
During 1966, a total of 520.1 tons of BOD was removed from the raw sewage by the treatment plant. A percent reduction of 90.0 was realized, although the average effluent BOD concentration of 21 ppm was slightly in excess of the OWRC objective of 15 ppm BOD.

Similarly for suspended solids, 1130.5 tons were removed. The treatment efficiency was 95.5%; however, the average final effluent suspended solids concentration of 20 ppm was also above the objective of 15 ppm.

Considering that part of the aeration section of the plant was inoperative awaiting the warranty repairs mentioned previously, the removal efficiencies realized for both BOD and suspended solids were good.

The suspended solids in the raw sewage were greater than normally expected for domestic sewage.

An estimated 832 cubic feet of grit was removed during the year for an average of 1.5 cubic feet removed per million gallons treated.



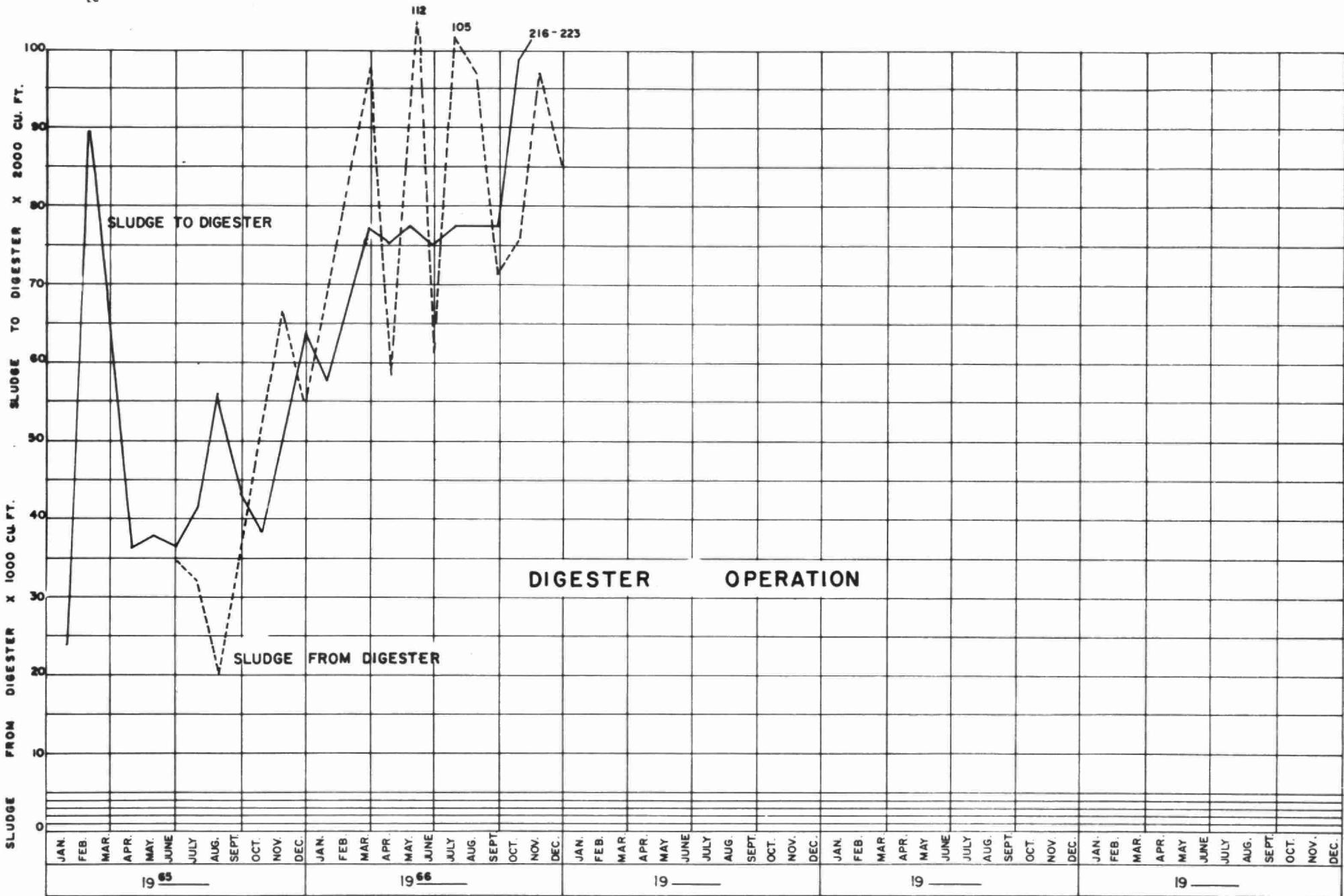
AERATION SECTION

MONTH	PRIM. EFFL B.O.D. PPM.	MLSS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.
JANUARY	130	2100	11
FEBRUARY	-	-	-
MARCH	130	1639	17
APRIL	134	1661	19
MAY	-	1542	-
JUNE	-	1785	-
JULY	118	1637	20
AUGUST	-	1490	-
SEPTEMBER	100	1611	20
OCTOBER	190	1809	27
NOVEMBER	21	1175	3
DECEMBER	-	1209	-
TOTAL	-	-	-
AVERAGE	118	1605	17

COMMENTS

The average primary effluent BOD applied to the aeration section during 1966 was 118 ppm. This, in conjunction with the average MLSS concentration of 1,605 ppm, gave an aeration loading of 17 pounds of BOD per 100 pounds of MLSS. This is slightly on the low side of the normal operating range of 20 to 40 pounds BOD per 100 pounds of MLSS.

Because the plant utilizes mechanical aeration, the air supply in units of cubic feet of air per pound of BOD removed cannot be determined.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	1000'S CU FT.	% SOLIDS	% VOL. MAT.	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	
JAN	18.46	6.40	4.60	-	8.22	4.18	349.42
FEB.	21.54	-	-	-	-	-	253.10
MAR.	24.68	5.76	3.24	15.31	5.94	3.05	364.70
APR.	24.04	4.74	-	9.23	4.49	2.35	361.60
MAY	24.84	-	-	17.98	-	-	294.45
JUNE	24.04	-	-	9.72	-	-	248.53
JULY	24.84	5.59	-	16.77	4.41	-	272.12
AUG.	24.84	-	-	15.55	-	-	291.70
SEPT.	24.84	4.14	2.90	11.42	5.40	-	216.38
OCT.	31.79	3.23	-	12.10	5.09	-	371.85
NOV.	34.62	4.39	2.45	15.55	4.82	2.35	444.76
DEC.	35.77	-	-	13.61	-	-	419.30
TOTAL	314.30	-	-	137.24	-	-	3887.91
AVG.	26.19	4.89	3.30	11.44	5.48	2.98	323.99

COMMENTS

During 1966, a total of 314,300 cubic feet of raw sludge was pumped to the digester and 137,240 cubic feet of digested sludge was hauled. The laboratory data on solids concentrations, volatile matter content in the supernatant and the raw and digested sludges indicate that a 55% to 60% reduction in volatile matter was accomplished. The criterion for good digestion is a 50% reduction in volatile matter; hence, the digestion process at the Newmarket-East Gwillimbury plant could be rated as very good. There was also a good gas production during the year.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	40.560	-	-
FEBRUARY	35.055	-	-
MARCH	48.793	-	-
APRIL	50.795	-	-
MAY	53.460	481*	5.58
JUNE	46.294	2554	5.52
JULY	41.880	2182	5.21
AUGUST	44.444	2224	5.00
SEPTEMBER	47.909	1719	3.59
OCTOBER	48.825	1820	3.73
NOVEMBER	37.761	-	-
DECEMBER	51.671	-	-
TOTAL	547.447	10980	-
AVERAGE	45.621	1830	4.61

* 5 days chlorination

COMMENTS

Chlorine is used to disinfect the final effluent before discharge to the Holland River. The chlorination period during 1966 was from May 27 to October 31 and a total of 10,980 pounds of chlorine was used at an average dosage rate of 4.61 ppm to maintain a chlorine residual of at least 0.5 ppm after 15 minutes' contact time.

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CONCLUSIONS

The plant operated well during 1966 and was maintained in good mechanical condition by the operational staff. The warranty deficiencies of the aerator drives were corrected and now operate satisfactorily.

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